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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/823,650	04/14/2004	Makoto Taniguchi	119443	4916

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EXAMINER
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TIBBITS, PIA FLORENCE

ART UNIT	PAPER NUMBER
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2838

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/24/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

**Application No.**

10/823,650

**Applicant(s)**

TANIGUCHI ET AL.

**Examiner**

Pia F. Tibbits

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 October 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 4,6 and 7 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,5 and 8-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 April 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 7/17/06.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

This Office action is in answer to the amendment filed 4/27/2006. Claims 1-16 are pending, of which claim 1 is amended, and claims 4, 6, 7 are non-elected.

**1.** For any amendment being filed in response to a restriction or election of species requirement and any subsequent amendment, any claims, which are non-elected, must have the status identifier (withdrawn). Any non-elected claims which are being amended must have either the status identifier (withdrawn) or (withdrawn – currently amended) and the text of the non-elected claims must be presented with markings to indicate the changes. Any non-elected claims that are being canceled must have the status identifier (canceled). See ***MPEP 701***.

**2.** Applicant made an election with traverse of claims 1-3, 5, 8-17, which was acknowledged in the subsequent non-final Office action mailed 7/21/2006, and applicant was informed that since applicant did **not** distinctly and specifically point out the supposed errors in the restriction requirement, the election was treated as an **election without traverse**. ***MPEP 818.03***. The requirement is still deemed proper and is therefore made **FINAL**. A complete reply to the final rejection must include cancellation of nonelected claims 4, 6, 7, or other appropriate action (***37 CFR 1.144***). See ***MPEP § 821.01***.

***Drawings***

**3.** The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the *input stopping means* must be shown or the feature(s) canceled from the claim(s). No new matter should be entered. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement-drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show

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the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the examiner does not accept the changes, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

4. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter: "*an input stopping means which, when the charge accumulating device is charged during learning, prevents the input of the current values and the terminal voltage values to the neural network until energy charged in the charge accumulating device is discharged*".

Claim 1 was amended to include the recitation

an input stopping means which, when the charge accumulating device is charged during learning, prevents the input of the current values and the terminal voltage values to the neural network until energy charged in the charge accumulating device is discharged.

which lacks antecedence in the disclosure, as originally filed. It seems that portions of canceled claim 17 were incorporated in claim 1:

17. The internal condition detection system for a charge accumulating device according to claim 1, further comprising: a charged input stopping means which, when the charge accumulating device is charged during learning, prevents the input of the current values and the terminal voltage values to the neural network until energy charged in the charge accumulating device is discharged.

However, amended claim 1 recited: "an input stopping means", while canceled claim 17 recited "a charged input stopping means".

See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction is required.

**Double Patenting**

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969). A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claims 1-3, 5, 8-17 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-38 of US publication 20060181245, **copending**

**Application No. 11353220** in view of **Sullivan et al.** [6064180].

Copending Application No. 11353220 recites:

1. A neural network type of apparatus for detecting an internal state of a secondary battery implemented in a battery system, the apparatus comprising: detecting means for detecting electric signals indicating an operating state of the battery; producing means for producing, using the electric signals, an input parameter required for estimating the internal state of the battery, the input parameter reflecting calibration of a present charged state of the battery; and estimating means for estimating an output parameter indicating the charged state of the battery by applying the input parameter to neural network calculation.

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2. The apparatus of claim 1, wherein the electric signals are voltage and current of the battery acquired in real time during a predetermined period of time; the input parameter consisting of a first input parameter indicating the operating state of the battery and a second input parameter indicating the degraded state of the battery; and the producing means comprises means for calculating the first input parameter on the basis of data of the voltage and current of the battery, and means for calculating the second input parameter in response to a state of predetermined charge of the battery.

while the instant application recites:

1. An internal condition detection system for a charge accumulating device comprising: a charge accumulating device for supplying power to an electric system; a current detecting means for detecting a charging and discharging current of the charge accumulating device; and a voltage detecting means for detecting a terminal voltage of the charge accumulating device; and a condition detecting means for detecting an internal condition of the charge accumulating device by learning an internal condition quantity of the charge accumulating device through a neural network which is fed with current values and terminal voltage values output from the current detecting means and the voltage detecting means, respectively, wherein the current values and the terminal voltage values are supplied so that historical information thereof are included.

an input stopping means which, when the charge accumulating device is charged during learning, prevents the input of the current values and the terminal voltage values to the neural network until energy charged in the charge accumulating device is discharged.

In other words, although the conflicting claims are not identical, they are not patentably distinct from each other because they both recite an internal condition detection system for a charge accumulating device comprising: a charge accumulating device for supplying power to an electric system; a current detecting means for detecting a charging and discharging current of the charge accumulating device; and

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a voltage detecting means for detecting a terminal voltage of the charge accumulating device; and a condition detecting means for detecting an internal condition of the charge accumulating device by learning an internal condition quantity of the charge accumulating device through a neural network which is fed with current values and terminal voltage values output from the current detecting means and the voltage detecting means, respectively, wherein the current values and the terminal voltage values are supplied so that historical information thereof are included.

Copending Application No. 11353220 does not recite an input stopping means which, when the charge accumulating device is charged during learning, prevents the input of the current values and the terminal voltage values to the neural network until energy charged in the charge accumulating device is discharged.

Sullivan's patent "*Method and apparatus for determining battery state-of-charge using neural network architecture*" discloses in figures 2 and 3, and at column 2, lines 1-3 and at column 4, lines 3-23:

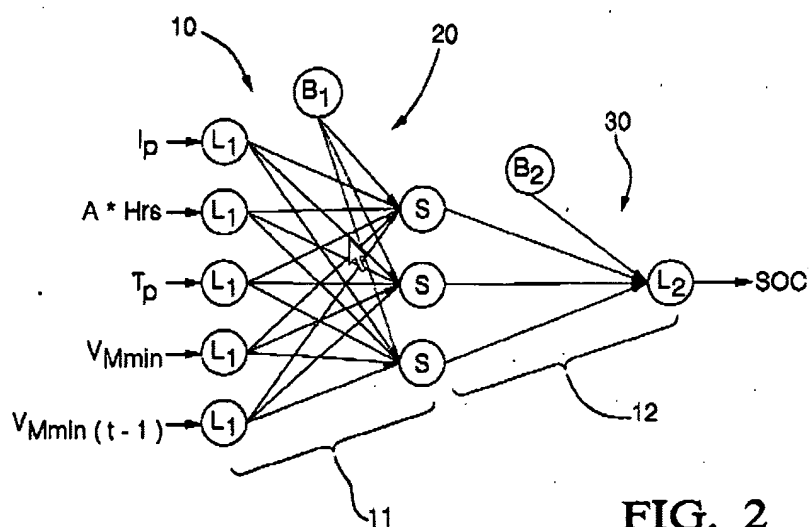


FIG. 2

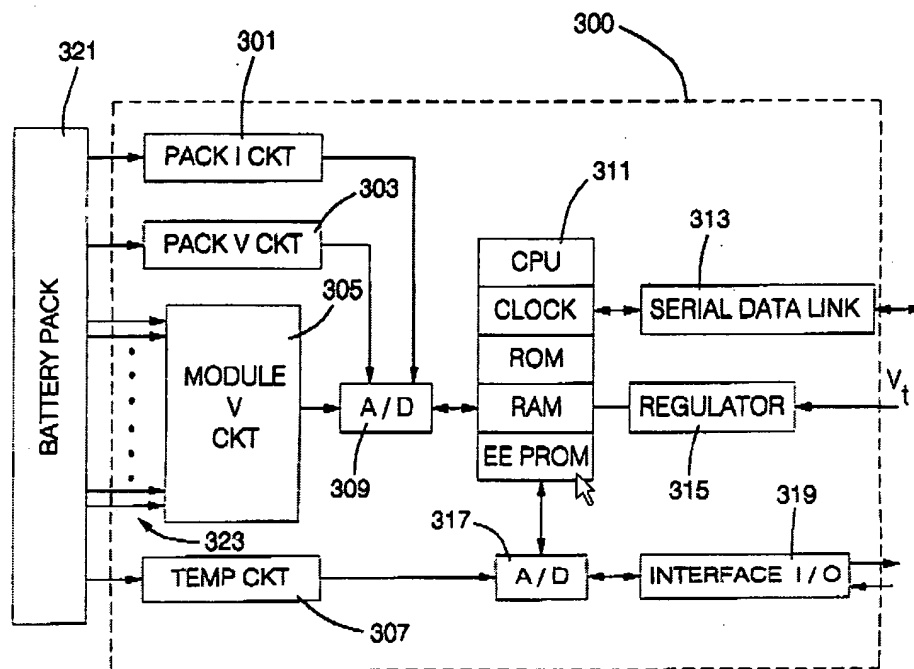


FIG. 3

(9) Another object of the present invention is to determine battery state-of-charge and capacity in a fashion which accounts for diverse discharge and recharge cycles and rates.

responses. Also, this is especially true at certain relatively high states-of-charge where charge acceptance is greatly reduced due to inefficiencies in material conversion and changes in charge currents cause non-linear terminal voltage responses. Also, over ranges of temperature and current magnitudes, the modules tend to display substantially non-linear relationships between terminal voltage and current. However, state-of-charge itself is generally a linear quantity with respect to constant discharge currents. Critical areas, and those

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify US publication 20060181245's apparatus and allow inputs to the neural



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network only during discharging, as taught by Sullivan, in order to avoid substantially non-linear relationships between terminal voltage and current of the battery.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

***Claim Rejections - 35 USC § 103***

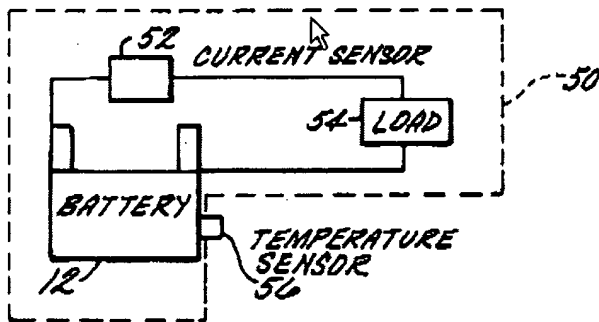
7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-3, 5, 8-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Singh et al.** [6011379] in view of **Sullivan**, as described above.

**Singh et al.** [6011379] discloses in figures 1-15 an internal condition detection system for a charge accumulating device comprising:

a charge accumulating device 12 for supplying power to an electric system 54 [see fig.11A];



***FIG. 11A***

a current detecting means 50 [see fig.11B] for detecting a charging and discharging current of the charge accumulating device;

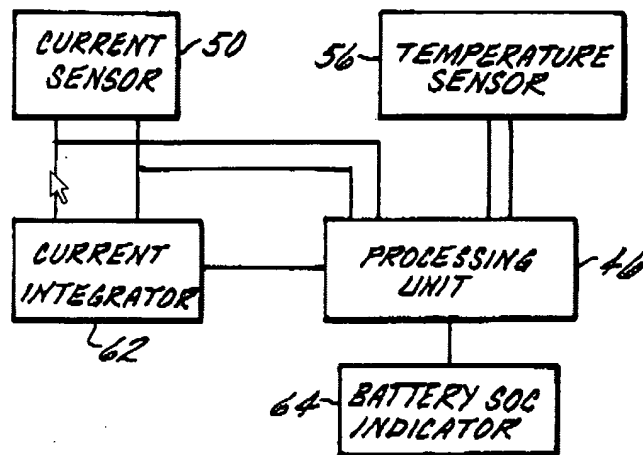


FIG. 11B

a voltage detecting means  $E_0$  [see fig.4A] for detecting a terminal voltage of the charge accumulating device;

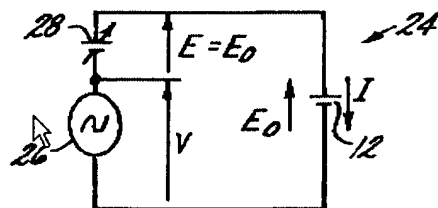


FIG. 4A

a condition detecting means for detecting an internal condition of the charge accumulating device by learning an internal condition quantity / SOC of the charge accumulating device through a neural network 16 [see fig.1] which is fed with current values and terminal voltage values output from the current detecting means and the voltage detecting means, respectively, wherein the current values and the terminal voltage values are supplied so that historical information thereof are included [see column 2, lines 63-67; column 3, lines 1-9, 48-49; column 4, lines 14-29; column 6, lines 13-14; column 8, lines 58-67; column 9, lines 1-15].

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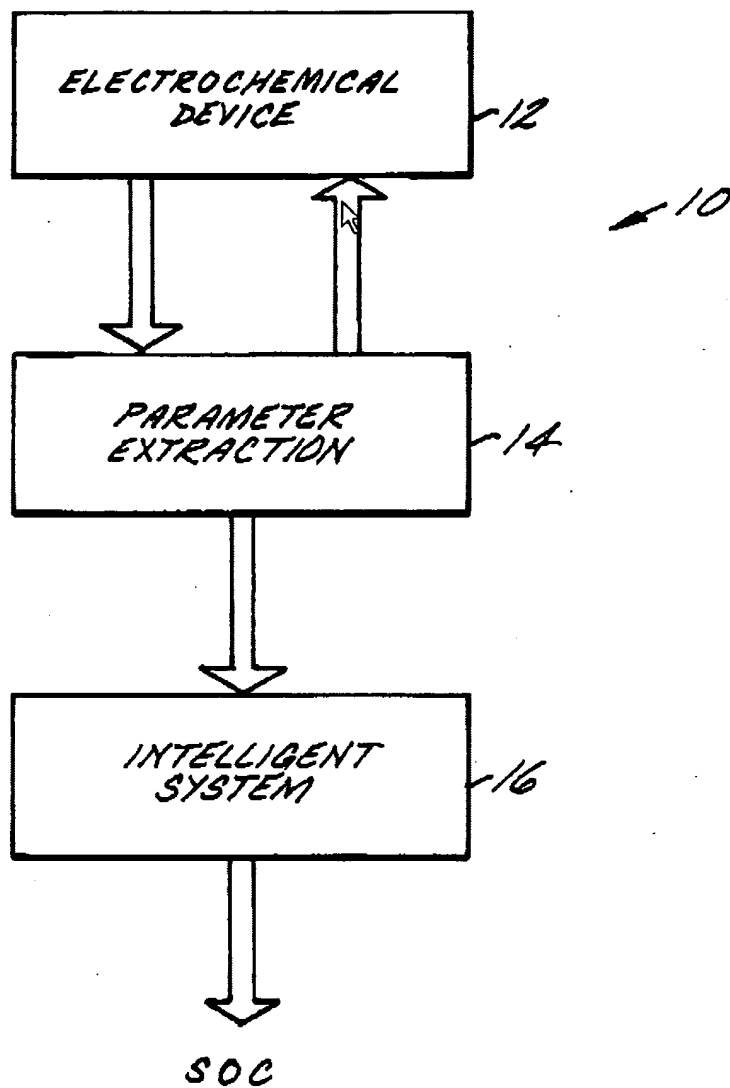


FIG. 1

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13) The intelligent system comprises any system that adaptively estimates or learns continuous functions from data without specifying how outputs depend on inputs. By way of example, the intelligent system includes an artificial neural system, a fuzzy system and other such model-free function estimators that learn. Learning, so-called, "tunes" an intelligent system. This learning process (also referred to as a training process) can be implemented in many ways. The intelligent system can be implemented using: an algorithm such as gradient descent and clustering used to tune neural networks and adaptive fuzzy systems; search optimization techniques such as those used by genetic algorithms; or an expert's guesses or trials and errors such as those used in fuzzy expert systems and fuzzy systems.

Singh does not disclose an input stopping means which, when the charge accumulating device is charged during learning, prevents the input of the current values and the terminal voltage values to the neural network until energy charged in the charge accumulating device is discharged.

Sullivan's patent "*Method and apparatus for determining battery state-of-charge using neural network architecture*" discloses that changes in *charge* currents cause non-linear terminal voltage responses. Also, over ranges of temperature and current magnitudes, the modules tend to display substantially non-linear relationships between terminal voltage and current. However, state-of-charge itself is generally a linear quantity with respect to constant *discharge* currents. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify Singh's apparatus and allow inputs to the neural network only during discharging, as taught by Sullivan, in order to avoid substantially non-linear relationships between terminal voltage and current of the battery.

As to claims 2, 3, 5, 8-16, see remarks and references above.

### ***Response to Arguments***

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9. Applicant's arguments with respect to the claims have been considered but are moot in view of the new grounds of rejection, and of Applicant's revision of claim 1, which is new issue.

***Conclusion***

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art cited in PTO-892 and not mentioned above disclose related apparatus:

**Anbuky et al.** [6924622] discloses an estimation model for predicting the absolute or relative capacity of a battery includes input for a variable battery parameter and one or more battery operating conditions and/or battery condition, reference information, compensation means determining a correction factor for the variable battery parameter, and calculation means relating corrected variable battery parameter to absolute or relative battery capacity. The method may include use of training or learning means adapted to determine reference information relating a variable battery parameter to one or more battery operating conditions and/or battery condition; or to determine rules relating variable battery parameter, or change in variable battery parameter, to one or more battery operating conditions and/or battery condition. Preferably, training or learning means may be any one of an Adaptive Neural Fuzzy Interface System or an Adaptive Network, or other Neuro-Fuzzy or Soft Computing system.

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**Bertness** [6909287, 6850037, 6633165, 6331762, 6329793] discloses a battery monitor can provide real time battery condition measurements and can selectively control the charging of the battery through an alternator of the vehicle based upon the measured battery condition. The functional relationship can be determined by characterizing multiple batteries or through the use of artificial intelligence techniques such as neural networks.

**Vonderhaar et al.** [6566883] discloses an electronic battery tester for testing a storage battery includes test circuitry configured to provide an output based upon a selected test criteria, where microprocessor 30 uses advanced testing criteria or testing techniques such as fuzzy logic, neural networks or other artificial intelligence techniques to detect and make decisions regarding the health of a battery or a battery pack.

**Duley** [5459671] discloses a battery monitoring system, a first level containing information relating to real-time battery variables, a second level containing information relating to analysis or trend behavior of the real-time battery variables, and a third level containing user information relating to user and/or maintenance parameters, the user information being derived from the first and/or second level information.

**Alber et al.** [5744962] discloses periodically measuring the capacity of the cells, wherein the type of measurement and/or the period between measurements is dependent upon the state of health of the cell or cells and/or the result of a previous test.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Pia Tibbits whose telephone number is 571-272-2086. If unavailable, contact the Supervisory Patent Examiner Karl Easthom whose telephone number is 571-272-1989. The Technology Center Fax number is 571-273-8300.

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13. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PFT

January 16, 2007

Pia Tibbits

Primary Patent Examiner